



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,384	12/06/2001	Gary F. Feierbach	04860P2679	2221

7590 03/13/2007  
James C. Scheller, Jr.  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP  
Seventh Floor  
12400 Wilshire Boulevard  
Los Angeles, CA 90025-1026

EXAMINER
----------

DATSKOVSKIY, MICHAEL V

ART UNIT	PAPER NUMBER
----------	--------------

2835

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/13/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/020,384	FEIERBACH, GARY F.	
	Examiner	Art Unit	
	Michael V. Datskovskiy	2835	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5, 7, 9-13, 15-23, 25-29, 31-35, 42, 43, 45 and 46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7, 9-13, 15-23, 25-29, 31-35, 42, 43, 45 and 46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____.                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____.  | 6) <input type="checkbox"/> Other: ____.                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed 01/29/2007 have been fully considered but they are not persuasive. Applicant amended the claims by changing a definition of a position of an integrated circuit from being "non-planar" to being: "disposed at an angle relative to the first open end", and argues that having done this he overcome the rejection over the prior art of record. Examiner respectfully disagrees: First: Although in Fig. 4, IC 415 is shown at an angle 420, this angle is disclosed in paragraph [0038] of the specification as illustrating: "the co-planarity difference between the closed end of flexible channel 303 and IC 415". Also in the previous paragraph [0037] applicant wrote: "As shown, flexible channel 303 is able to conform to electronic and electrical devices that are not co-planar with the cooling device or that are not co-planar with the printed circuit board. of IC's 415" Therefore examiner concludes that by changing a definition of an integrated circuit from being "non-planar" to being: "disposed at an angle relative to the first open end" applicant has not changed any structural limitations to the previously claimed structure, but rather exchanged one synonym for the other to claim that same structural limitation.

Second: It is well known in the art that bellows are inherently flexible enough to compensate significant misalignments of ICs. See for example Mittal et al (Previously cited US patent 4,450,505), col. 1, lines 50-53; and col. 2, lines 51-54, where it is clearly

stated that: "Due to the inherent flexibility of bellows 26, end 44 will comply or conform into abutting engagement with surface 32 in response to being urged into surface-to-surface contact with a respective chip 30". Kajiwara et al (US Patent 4,740,866) in col. 1, lines 29-38 also clearly illustrate that bellows are inherently flexible enough to compensate significant misalignments of ICs. If applicant will disagree with examiners arguments it is highly desirable for him to provide an explanation of the structural differences between IC "being not coplanar" or being: "disposed at an angle relative to the first open end", and to point out, where in the specification such differences have been disclosed.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-2, 5, 11-12, 15-16, 18-22, 25, 42 and 45 are rejected under 35 U.S.C. 102(b) as being anticipated by Downing.

Downing teaches a cooling device 10, Figs. 1-2, for removing heat from an integrated circuit, said cooling device comprising: a conduit 11, a flexible channel 17 to alternate between a compressed position and an extended position (col. 3, lines 15-37, and col. 4, lines 55-68), and having a first open end and a second closed end, said first open end coupled with said conduit 11, said open end having an internal width, said flexible

channel 17 comprised of a resilient material having spring-like characteristics, said material to provide a spring-like restoring force when compressed, the second closed end comprising a thermally conductive material 23 attached to said flexible channel 17, said thermally conductive material 23 having a substantially planar surface to interface directly with said integrated circuit when said flexible channel is extended and to detach from said integrated circuit in said compressed position; an interconnect mechanism between said conduit and said flexible channel to allow a fluid introduced within said conduit to move between said conduit and said flexible channel 17, and a heat sink (18, 19, 21) attached to an interior surface 28 of said closed end to cause heat absorbed by said closed end to be conducted through said conduit 11 and said flexible channel 17.

Downing teaches furthermore) said cooling device as in Claim 1, wherein said interconnect mechanism is an opening 22 in a surface of said conduit 11, wherein said flexible channel 17, including said closed end 23, is sealed, and further comprising ports 12 for coupling to a pump coupled to said conduit 11 configured to reduce a pressure in said conduit and said flexible channel to compress said flexible channel and to remove said conductive material from said integrated circuit (col. 3, lines 15-37, and col. 4, lines 55-68). Although the device by Downing is a cooler, it is inherent that a cooled fluid is getting heated after contacting a heat sink and a thermally conductive end 23. Although Downing does not directly teach said flexible channel being conformable with a non-planar integrated circuit (or being disposed at an angle relative to the first open end), it is inherent that bellows are flexible enough to compensate significant misalignments of ICs (See response to the arguments above).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 4, 7, 13, 17, 26-28, 43, 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Downing in view of Mittal (US Patent 4,450,505).

Downing teaches all the limitations of the claims except: said opening has a width equal to said internal width of said open end (claim 3); certain types of materials used to couple said flexible channel to said conduit (claim 4), or to make said closed end of said flexible channel (claim 7); and certain ranges of the cooling fluid pressure to manipulate expanding of said flexible channel (claims 13, 17, 26-28, 43 and 46). It would have been obvious to one having ordinary skill in the art at the time the invention was made to make said closed end heat sink and said flexible channel from such claimed materials, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice, (*In re Leshin*, 125 USPQ 416), and also it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. With respect to claim 9, Downing teaches all the limitations of the claim except said flexible channel is made of resilient material comprising a material selected from the group of

which phosphor bronze and beryllium copper are members, neither said flexible channel being conformable with a non-planar integrated circuit. With respect to claims 23 and 29, Downing teaches all the limitations of the claims except a cooling device as in Claim 19, further comprising: a plurality of flow diverters attached within said conduit to create turbulence in said fluid (claim 23); and a cooling device as in Claim 1, wherein said heat sink extends into said conduit in said extended position (claim 29). Mittal et al teach a cooling device 10, Fig. 1, for removing heat from an integrated circuit 30, said cooling device comprising: a conduit 48, a flexible channel 26 having a first open end and a second closed end, said first open end coupled with said conduit 48, said open end having an internal width, said flexible channel 26 comprised of a resilient material – Beryllium Copper having spring-like characteristics, said material to provide a spring-like restoring force when compressed, said material providing to said flexible channel enough flexibility to conform with surface 32 of chip 30 (col. 2, lines 46-59); the second closed end comprising a thermally conductive material 44 attached to said flexible channel 26, said thermally conductive material 44 having a substantially planar surface to interface directly with said integrated circuit when said flexible channel is extended; an interconnect mechanism between said conduit and said flexible channel to allow a fluid introduced within said conduit to move between said conduit and said flexible channel 26, and a heat sink 28 attached to an interior surface of said closed end 44 to cause heat absorbed by said closed end to be conducted through said conduit 48 and said flexible channel 26; wherein said heat sink 28 extends into said conduit in said extended position, and further comprising: a plurality of flow diverters 29 attached within

said conduit to create turbulence in said fluid. It would have been obvious to one having ordinary skill in the art at the time invention was made to make said flexible channel in the device by Downing from Beryllium Copper as it is done by Mittal et al, and also to extend said heat sink into said conduit and to provide flow diverters, as it is also done by Mittal et al, in order to enhance heat dissipation of the device.

6. Claims 10 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Downing or over Downing in view of Mittal et al as applied to claims 1 and 29 above, and further in view of Yamamoto et al (Previously cited US Patent 4,729,060). Downing in view of Mittal et al teach all the limitations of the claims except a cooling device as in Claim 1, wherein said resilient material is pleated (claim 10); and A cooling device as in Claim 29, wherein said heat sink comprises a plurality of spaced apart planar fins (claim 31). Yamamoto et al teach a cooling device 10, Figs.1, 11, for removing heat from an integral circuit (IC) 7, said cooling device comprising: a conduit 1; a sealed flexible channel 5 having a first open end and a second thermally conductive closed end 3, said flexible channel is made of a resilient material having spring-like characteristics and providing a spring-like restoring force when compressed, said second end thermally conductive material (copper) having a substantially planar surface to interface directly with said IC 7; an interconnect openings between said flexible channel and said conduit to allow a fluid to move between said conduit and said flexible channel; and a port for coupling to a pump 25 coupled to said conduit 1. Yamamoto et al teach furthermore a heat sink 75 having a plurality of spaced apart planar fins 77,



said heat sink being attached to an interior surface of said closed end 3 to conduct heat absorbed by said closed end through said heat sink to said cooling fluid contained within said conduit 1 and said flexible channel 5. Yamamoto et al teach furthermore said resilient material could be pleated (col. 4, line 44). It would have been obvious to one having ordinary skill in the art at the time invention was made to make said resilient material pleated and said heat sink having a plurality of spaced apart planar fins in the device by Downing and Mittal et al as it is disclosed by Yamamoto et al as an obvious matter of design choice, since applicant has not disclosed that choosing a pleated material or providing a heat sink by a plurality of planar fins solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with any kind of a flexible enough material or a heat sink having enough of a heat dissipating surface.

7. Claims 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Downing as applied to claim 1 above, and further in view of Hisano et al.

Downing teaches all the limitations of the claims except said conduit as a heat pipe comprising a wicking material. Hisano et al teach a cooling device, Fig. 29, for removing heat from an integral circuit 1 (IC), said cooling device comprising: a conduit 81b; a sealed flexible channel 81a having a first open end and a second thermally conductive closed end 82, said flexible channel is made of a resilient material, said second end thermally conductive material having a substantially planar surface to interface directly with said IC 1; an interconnect openings between said flexible channel and said conduit

to allow a fluid to move between said conduit and said flexible channel 81a; wherein said conduit 81b is a heat pipe comprising a wicking material (col.18, lines 19-22). It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ a heat pipe comprising a wicking material, as Hisano et al show it, in the device by Downing and Mittal et al, in order to enhance heat dissipation.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V. Datskovskiy whose telephone number is (571) 272-2040. The examiner can normally be reached on 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayprakash N. Gandhi can be reached on (571) 272-3740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Michael V Datskovskiy  
Primary Examiner  
Art Unit 2835

03/06/2007